

*U.S. Agency for International Development
Africa Bureau / Office of Sustainable Development
Productive Sector Growth and Environment Division*
**Technology Development and Transfer
Collaborators Workshop**

*January 24-27, 1995
Harare, Zimbabwe*



Workshop Synopsis

The Workshop

About 130 persons participated in the agricultural Technology Development and Transfer (TDT) Collaborators Workshop, held January 24-27, 1995, in Harare, Zimbabwe. Participants included representatives of international research centers, U.S. and African universities, African research institutes, non-governmental organizations and USAID field and Washington offices. The sponsor of the workshop was USAID, Africa Bureau, Office of Sustainable Development, Productive Sector Growth and Environment Division.

Workshop Objectives:

- To provide a forum for the TDT community and policymakers to examine the experience of technology development and transfer efforts in Africa.
- To identify future challenges and explore ways to expand TDT's contribution to development efforts.

The workshop reconfirmed agriculture's key role in economic development. In plenary and breakout sessions, participants examined how TDT contributes to development objectives, how national and regional systems are working to strengthen the institutional framework for TDT, and how technology affects the success of investments in agriculture, natural resources management and economic growth.

TECHNOLOGY DEVELOPMENT AND TRANSFER

Supporting Agricultural Transformation in Africa

Case studies show that agricultural research can yield rates of return that exceed by a wide margin the returns on investment commonly expected in non-agricultural areas. Also, African growth multipliers are larger than previously thought, particularly in the food crop sector where spending patterns for poor households generate larger consumption multipliers than those of wealthy households.

In rural areas, agricultural exports provide income to boost the economy, sustain growth, and promote agricultural and structural transformation—the movement of the economy away from subsistence-oriented, household-level production toward an integrated economy based on greater specialization, exchange and the capturing of economies of scale. Investment decisions should be based on analysis that identifies high-potential sectors and pinpoints the complementary policies needed to encourage technology adoption and foster an elastic supply of goods as farm incomes rise.

Improved seed, fertilizer and animal traction are among the most important determinants of farm productivity in Africa. To promote a productive agriculture sector, governments need to provide selective support for these key inputs, even during structural

adjustment. Useful options include investment in rural roads and infrastructure, an intermediate level of price support for inputs, and generation of new technology.

The management of natural resources is critical to preserve fragile environments and sustain agricultural land resources. Rising populations are using low-input technology for crop and livestock production and contributing to the degradation of land resources, especially in hilly and semiarid regions. In parts of East and southern Africa, economic management of wildlife offers an attractive income-generating alternative to farming, with less risk to the environment.

KEY CHALLENGES

Participants reached consensus on six key challenges to be addressed in ongoing TDT efforts.

1 Institutional Reforms

Institutional reform is a necessary precondition for the acceleration of agricultural growth. Although institutional reform is a long-term, continuous process, experience in countries such as Kenya and Mali is promising.

The Kenyan Agricultural Research Institute (KARI) initiated institutional reforms in 1989. The key reforms are making research more problem-oriented, involving clients to a greater extent in research planning and implementation, streamlining research management, and developing alternative funding sources.

Recently, the Institut d'Economie Rural (IER) in Mali changed its legal status from a branch of the ministry to a quasi-private, autonomous, research foundation. By 1997, most researchers will switch from civil service status and become contractors with responsibility for executing research projects. Innovations include regional user commissions to ensure that research is relevant and a consolidated financial management system to allow research to be driven more by Malian priorities than by donor interests. At the

same time, high levels of transparency and accountability are being maintained.

Sustainable financing is a critical issue for most national agricultural research systems because public funds for research are declining. Alternatives such as endowments, commercialization, voluntary checkoffs and debt conversions are generating modest levels of funding (4-8 percent of budget) in several countries. Negotiations with finance ministries are necessary to ensure that funds generated from TDT activities are

Participants recommended that institutional reform efforts:

- Make research more demand driven.
- Involve clients (i.e., large and small farmers, the private sector and consumers) in TDT activities.
- Increase linkages between universities and agricultural ministries.
- Explore innovative funding mechanisms for sustainable financing.
- Increase and improve linkages among commercial and public sector organizations.
- Improve donor coordination.

reinvested in national agricultural research systems, instead of reverting to the national treasury. Case studies of sustainable financing experiences are needed in order to improve understanding of the conditions that must be satisfied to increase the probability of success.

Evidence from the International Service for National Agricultural Research (ISNAR) suggests that, in general, semipublic research institutes, with their greater autonomy over personnel conditions and financing, have been more successful than purely public institutes in providing operational resources and attractive salaries for scientists, and in maintaining wage costs as a smaller portion of total costs.

② Human Resource Development

During the past 30 years, the average size of national agricultural research systems (NARS) in Africa has increased fourfold. Although many countries now have a “critical mass” of agricultural scientists, na-

Participants recommended that human resource development efforts:

- Institute reforms needed to improve the working environment for agricultural scientists in African institutions.
- Invest in skills development that will increase the contribution of national agricultural research systems to raising agricultural productivity.

tional expenditures on research have not kept pace with the number of scientists. Researcher motivation has deteriorated because of low salaries and the lack of operating funds. As a result, there has been a general exodus of scientists from NARS to higher paying sectors. Initiatives to retain human capital are increasingly urgent. Some NARS have been investigating institutional reforms, downsizing, privatizing, and contracting to address these problems.

In the past, training emphasized the agricultural production disciplines. But to achieve economic productivity gains, NARS must begin to emphasize other areas of the TDT chain. Other relevant areas include food processing, marketing, management (logistical, financial and personnel), licensing, contracting and patenting, task management and planning, and policy research. Investing in human resources in these areas could help create the more client-responsive and demand-oriented NARS needed to revitalize agricultural productivity.

③ Strategic Planning and Priority Setting

Strategic planning is a process to ensure that agricultural research activities promote agricultural transfor-

mation. Priority setting is the aspect of strategic planning that establishes the relative importance of commodities and issues to national and regional research systems. Initiating strategic planning and priority setting may be costly in terms of demands on manpower, but investments in institutionalizing planning processes can have a high payoff. Strategic planning and priority setting can help NARS target limited resources and increase the probability of TDT success. Over time, strategic planning and priority setting can help countries exploit their comparative advantages, respond to new trade opportunities, and integrate natural resources management and agriculture.

There is no cookbook for strategic planning and priority setting. The people who will implement the plan—researchers, policymakers and stakeholders—must sit down and work together in a continuing process of trying to maximize the social contribution of

Participants recommended that strategic planning and priority setting efforts:

- Broaden strategic planning and priority-setting approaches to facilitate the identification of constraints and opportunities for increased agricultural productivity throughout the food and fiber system, not just at the farm level.
- Develop improved methods to help regional and national systems institutionalize strategic planning and priority-setting processes.
- Include a wide cross-section of stakeholders and clients in strategic planning and priority setting.

TDT systems. Strategic planning and priority setting must be framed within the goals and choices made at the national level, recognizing national guidance on efficiency, equity and other goals. It should involve a broad cross-section of clients and stakeholders (not just scientists) and include representatives of various stages of the commodity system (production, post-

harvest storage, marketing, transportation and processing).

Workshop participants recognized the value of regional collaboration and the need to improve linkages between regional and national systems. Difficulties arise because regional and national agendas may conflict, but regional opportunities may allow national systems to conserve national resources while they build on their comparative scientific advantages and benefit from the expertise of partner countries.

④ Accountability and Impact

Impact assessment is a valuable tool that can assist in planning. Recent impact assessments have shown that TDT investments in sub-Saharan Africa can have high payoffs, but complementary investments (i.e., roads, market systems and marketing policies) play important facilitating roles. Attributing credit for positive impacts is often difficult because many different donors and activities may contribute to the outcome.

Workshop participants recommended that TDT systems institutionalize impact assessment, and make it more cost-effective, efficient and sustainable.

Participants recommended that accountability and impact efforts:

- Make impact assessment an integral part of TDT activities from their inception.
- Invest in training for impact assessment.
- Use simple methods of assessment while capacity is being strengthened.
- Eliminate costly management.
- Integrate agriculture and natural resources management in impact assessment.
- Develop more cost-effective methods of impact assessment.

⑤ Empowerment and Advocacy

Agriculturalists need to promote the results of their work. Studies show that agricultural research has made substantial contributions to economic growth in Africa, yet investments in agriculture lag behind those in other sectors, and support for technology development and transfer has declined during the past decade.

Participants recommended that empowerment and advocacy efforts:

- Address the need for advocacy efforts with policymakers and political leaders.
- Explore opportunities to empower farmers and other client groups to represent their own interests.
- Pay special attention to the role of women farmers in African agriculture.

⑥ Technology Availability and Use

Participants examined the flow of technology in Africa and explored ways of improving production, processing, and marketing by commodity group. The emphasis was on improving productivity in the whole commodity system. Participants recognized that focusing on farm-level production was inadequate, and that increased attention to off-farm elements of the system—including technology, private investment and policies—is needed.

Participants offered the following overviews with the caveat that generalities are very difficult to make for a continent in which agriculture and the ecosystems that support it are diverse.

♦ Livestock

Management of livestock is a major challenge, especially in the marginal semiarid areas where livestock

is the predominant activity and has potentially negative effects on the environment. The major constraints to increased livestock productivity are breeds, disease, management, feed availability and land-use policies.

Participants recommended that livestock technology efforts:

- Encourage researchers to adopt a participatory approach to the generation of improved technology.
- Support plans and programs for improving the management skills of holders in sustainable feeding systems.
- Actively promote the creation of a policy environment that is supportive of livestock production, including access to feed, fodder, and markets.

♦ *Millet/Sorghum*

Recently developed technologies have had a positive and significant impact on sorghum production. However, participants noted that the inelasticity of demand for sorghum and millet may limit the economic impact from production increases.

In general, limited progress has been made in the adoption of improved sorghum and millet technologies during the past 30 years. Although there are several exceptions to this observation, the general pattern underscores the need to examine the development strategies for improving the productivity of sorghum-based systems and to compare the impact from these systems with other options in making research investments.

♦ *Natural Resources Management Technology*

Farmers and communities often fail to recognize the benefits of adopting natural resources management

technologies. Policy is a key factor influencing adoption. Resource tenure is an important issue to be addressed. Participants recognized the need for research that integrates natural resources management with the livelihoods of local residents, including farmers, herders, fishermen and woodcutters.

♦ *Post-Harvest Processing Technology*

The objective of focusing on post-harvest processing technology is to create a coalition of interested groups (i.e., researchers, extension workers, producers, processors and consumers) and generate technologies for priority products throughout the subsector. The goal is to generate value-added products that benefit each client group, providing increased income, additional employment and improved nutrition.

Participants recommended that post-harvest processing technology efforts:

- Give more emphasis to post-harvest research, processing, and commercialization of technology by involving nongovernmental organizations and the private sector.
- Provide support to existing services (nongovernmental organizations, user groups, small and medium enterprises, cooperatives) by identifying market niches and by being responsive to gender issues and opportunities.
- Explore opportunities for training programs on agribusiness (product) development that bring together researchers, development agencies, and rural and urban entrepreneurs.
- Support institutional reforms to encourage better private-public sector collaboration.
- Work on simple-to-use and cheap implements and equipment at each stage of product development.

♦ *Maize/Rice*

Although many improved varieties for maize have been developed, overall maize yield growth remains close to zero. The adoption of improved maize technology has been constrained by unfavorable policies, ineffective extension and input delivery systems, and emphasis on varietal characteristics rather than yield.

Technology development for rice is complex because rice is grown in very diverse agroecological zones and cropping systems. The potential for development is much greater in low land areas. New directions for research include breeding for stress resistance that is specific to different ecosystems and breeding for unfavorable management.

In general, participants felt that expansion of commercial production of cereals has been limited by poor seed production and distribution.

♦ *Roots, Tubers and Beans*

Roots and tubers (i.e., potato, sweet potato, cassava and yam) are the major staple crops covering more

than 25 countries in sub-Saharan Africa. These crops contribute greatly to food security during both drought and normal growing seasons. Major challenges relate to the multiplication and distribution of improved materials, the development of post-harvest processing technology and markets, the need for private-public sector collaboration, and the need for training on processing and product development.

Participants recommended that TDT efforts in roots, tubers and beans:

- Support and improve multiplication and distribution of improved materials through nongovernmental organizations and contract farming.
- Increase research focus on post-harvest processing.
- Provide training in processing/product development.
- Extend technologies for climbing beans (now in Rwanda) to neighboring countries.
- Improve access to seed through local organizations.

Publications

The following TDT technical papers, disseminated at the Zimbabwe workshop, are publications produced by USAID/AFR/SD/PSGE. Copies of these and other publications, including a complete set of workshop papers, are available upon request by contacting David Gately, USAID/AFR/SD/PSGE, 1111 N. 19th Street, Suite 307, Rosslyn, VA 22209, U.S.A. Fax: 703-235-5064; Internet: dgately@usaid.gov.

- ♦ *Agricultural Research in Africa: A Review of USAID Strategies and Experience.* December 1994. SD Technical Paper No. 3
- ♦ *Developments in Potato Research in Central Africa* December 1994. SD Technical Paper No. 5
- ♦ *Impact Assessment of the SAFGRAD Commodity Networks.* May 1993
- ♦ *The Impact of Agricultural Technology in Sub-Saharan Africa: A Synthesis of Symposium Findings.* English, June 1993. French, September 1993. ARTS Technical Papers nos. 3, 3F

- ♦ *Maize Research Impact in Africa: The Obscured Revolution (complete version).* December 1994. SD Technical Paper No. 7
- ♦ *Proceedings of the Agricultural Technology Development and Transfer Collaborators Workshop (June 28-30, 1994 / Washington, D.C.)*
- ♦ *Proceedings of the East Africa Agricultural Research Networking Workshop.* October 1993. ARTS Technical Papers No. 4
- ♦ *Regionalization of Research in West and Central Africa: A Synthesis of Workshop Findings and Recommendations.* December 1994. SD Technical Paper No. 4
- ♦ *Strategic Framework for Agricultural Technology Development and Transfer in Sub-Saharan Africa.* December 1992. (Revision in progress.)



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